

**TENTATIVE**

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

# TC7WBL125FK

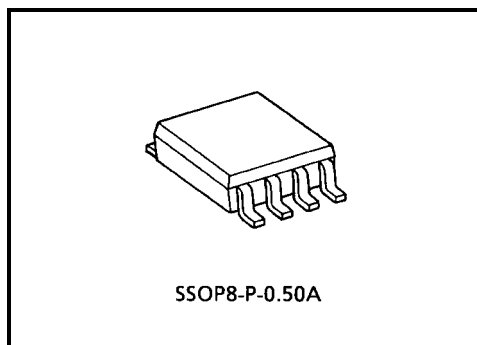
## Dual Low-Voltage Bus Switch

The TC7WBL125FK is a low on-resistance, high-speed CMOS 2-bit bus switch with low voltage operation. This bus switch allows the connections or disconnections to be made with minimal propagation delay while maintaining Low power dissipation which is the feature of CMOS.

When output enable ( $\overline{OE}$ ) is at low level, the switch is on; when at high level, the switch is off.

P-MOS and N-MOS channel block also allows that the device is suitable for analog signal transmission.

All inputs are equipped with protection circuits to protect the device from static discharge.

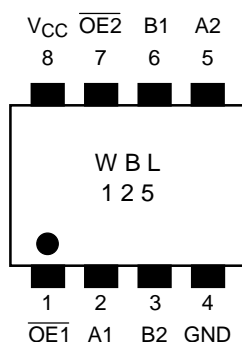


Weight: 0.01 g (typ.)

## Features

- Operating voltage:  $V_{CC} = 2 \sim 3.6 \text{ V}$
- High speed operation:  $t_{pd} = 0.25 \text{ ns (max) @3 V}$
- Ultra-low on resistance:  $R_{ON} = 5 \Omega \text{ (typ.) @3 V}$
- Electro-static discharge (ESD) performance:  $\pm 200 \text{ V}$  or more (JEITA)  
 $\pm 2000 \text{ V}$  or more (MIL)
- High noise immunity:  $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (min)}$
- Power-down protection for inputs and I/O terminal.
- Package: US8

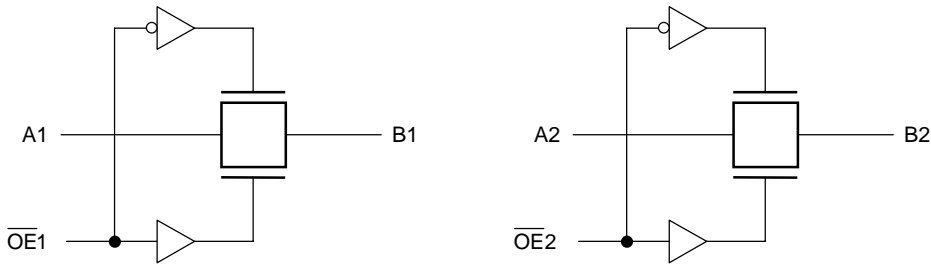
## Pin Assignment (top view)



Truth Table

Inputs	Function
OE	
L	A port = B port
H	Disconnect

System Diagram



Maximum Ratings

Characteristics	Symbol	Rating	Unit
Power supply voltage	$V_{CC}$	-0.5~7.0	V
Control pin input voltage	$V_{IN}$	-0.5~7.0	V
Switch terminal I/O voltage	$V_S$	-0.5~7.0	V
Clump diode current	$I_{IK}$	-50	mA
Switch I/O current	$I_S$	128	mA
Power dissipation	$P_D$	200	mW
DC $V_{CC}$ /GND current	$I_{CC}/I_{GND}$	$\pm 100$	mA
Storage temperature	$T_{stg}$	-65~150	$^{\circ}C$

Recommended Operating Conditions

Characteristics	Symbol	Rating	Unit
Power supply voltage	$V_{CC}$	2.0~3.6	V
Control pin input voltage	$V_{IN}$	0~5.5	V
Switch I/O voltage	$V_S$	0~5.5	V
Operating temperature	$T_{opr}$	-40~85	$^{\circ}C$
Control pin input rise/fall time	$dt/dv$	0~10	ns/V

## Electrical Characteristics

## DC Characteristics (Ta = -40~85°C)

Characteristics		Symbol	Test Condition	V <sub>CC</sub> (V)	Min	Typ.	Max	Unit
Control pin input voltage	“H” level	V <sub>IH</sub>	—	2.0~3.6	0.7 × V <sub>CC</sub>	—	—	V
	“L” level	V <sub>IL</sub>	—	2.0~3.6	—	—	0.3 × V <sub>CC</sub>	
Input leakage current		I <sub>IN</sub>	V <sub>IN</sub> = 0~5.5 V	2.0~3.6	—	—	±1.0	μA
Power off leakage current		I <sub>OFF</sub>	A, B, $\overline{\text{OE}}$ = 0~5.5 V	0	—	—	±1.0	μA
Off-state leakage current (switch off)		I <sub>SZ</sub>	A, B = 0~5.5 V, $\overline{\text{OE}}$ = V <sub>CC</sub>	2.0~3.6	—	—	±1.0	μA
ON resistance  (Note 3)	R <sub>ON</sub>	V <sub>IS</sub> = 0 V, I <sub>IS</sub> = 30 mA (Note 1)	3.0	—	2	7	Ω	
		V <sub>IS</sub> = 3.0 V, I <sub>IS</sub> = 30 mA (Note 1)	3.0	—	3	7		
		V <sub>IS</sub> = 2.4 V, I <sub>IS</sub> = 15 mA (Note 1)	3.0	—	5	15		
		V <sub>IS</sub> = 0 V, I <sub>IS</sub> = 24 mA (Note 2)	2.3	—	3	10		
		V <sub>IS</sub> = 2.3 V, I <sub>IS</sub> = 24 mA (Note 2)	2.3	—	4	15		
		V <sub>IS</sub> = 1.7 V, I <sub>IS</sub> = 15 mA (Note 2)	2.3	—	9	25		
Quiescent supply current		I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND, I <sub>OUT</sub> = 0	3.6	—	—	10	μA

Note 1: The typical values are at V<sub>CC</sub> = 3.3 V, Ta = 25°C.

Note 2: The typical values are at V<sub>CC</sub> = 2.5 V, Ta = 25°C.

Note 3: Measured by the voltage drop between A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltages on two (A or B) pins.

## AC Characteristics (Ta = -40~85°C)

Characteristics		Symbol	Test Condition	V <sub>CC</sub> (V)	Min	Max	Unit
Propagation delay time (bus to bus)	t <sub>pLH</sub> t <sub>pHL</sub>	Figure 1, Figure 2	(Note 4)	3.0	—	0.25	ns
				2.3	—	TBD	
Output enable time	t <sub>pZL</sub> t <sub>pZH</sub>	Figure 1, Figure 3		3.0	—	TBD	ns
				2.3	—	TBD	
Output disable time	t <sub>pLZ</sub> t <sub>pHZ</sub>	Figure 1, Figure 3		3.0	—	TBD	ns
				2.3	—	TBD	

Note 4: This parameter is guaranteed by design but is not tested. The bus switch contributes no propagation delay other than the RC delay of the typical on resistance of the switch and the 50 pF load capacitance, when driven by an ideal voltage the source (zero output impedance).

## Capacitive Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	V <sub>CC</sub> (V)	Typ.	Unit
Control pin input capacitance		C <sub>IN</sub>	(Note 5)	3.0	3	pF
Switch terminal capacitance		C <sub>I/O</sub>	$\overline{\text{OE}}$ = V <sub>CC</sub> (Note 5)	3.0	10	pF

Note 5: This item is guaranteed by design.

AC Test Circuit

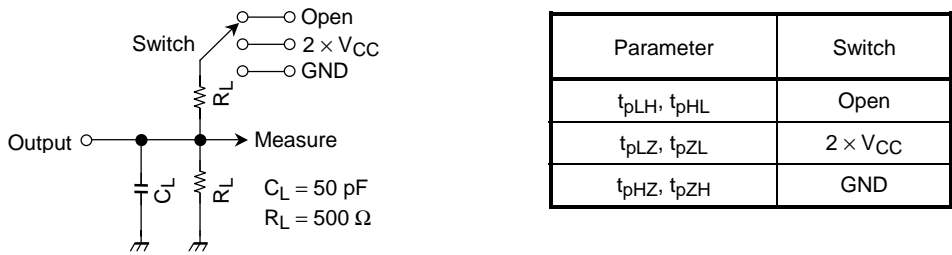


Figure 1

AC Waveform

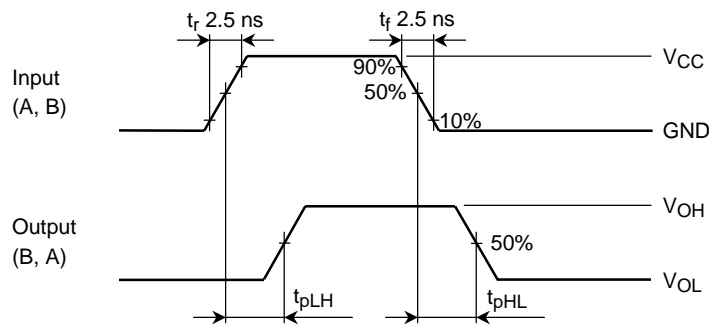


Figure 2  $t_{pLH}$ ,  $t_{pHL}$

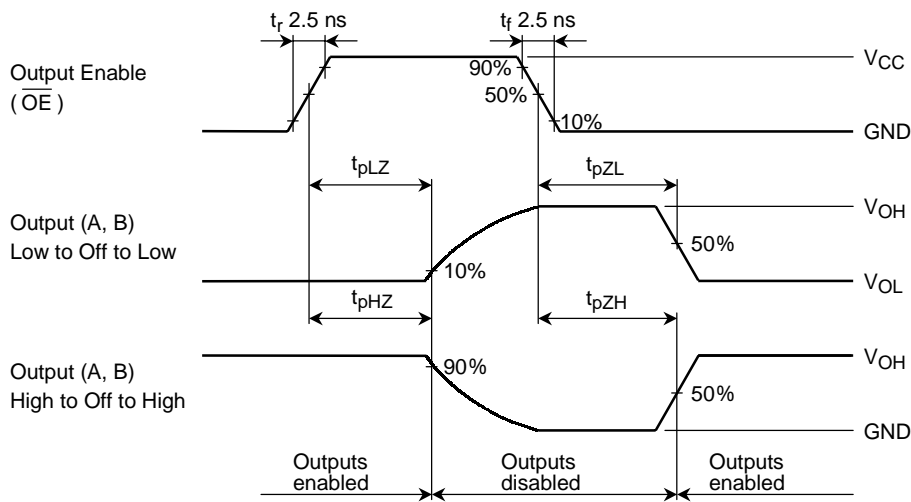
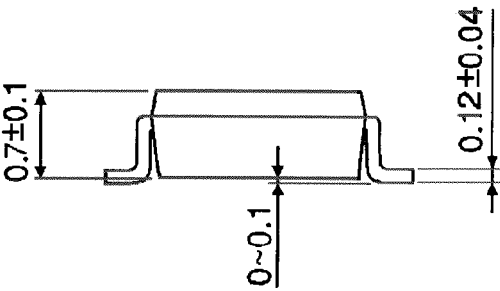
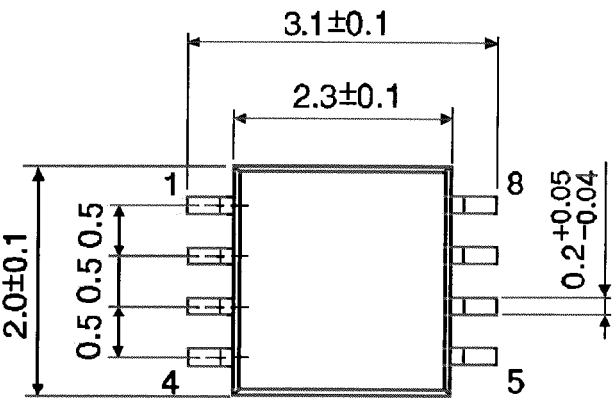


Figure 3  $t_{pLZ}$ ,  $t_{pHZ}$ ,  $t_{pZL}$ ,  $t_{pZH}$

Package Dimensions

SSOP8-P-0.50A

Unit : mm



Weight: 0.01 g (typ.)

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